**3GPP TSG-SA5 Meeting #162 *S5-254025***

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**Source: Huawei, China Mobile**

**Title: Rel-19 pCR TS 28.561 Add reference and abbreviations**

**Document for: Approval**

**Agenda item: 6.19.5.1**

**Spec: 3GPP TS 28.561**

**Version: 1.0.0**

**Work Item: NDT**

**Comments**

This contribution is proposed to add reference of TS 28.104 and also add the abbreviation used in this TS.

**Proposed Changes**

\* \* \* First Change \* \* \* \*

## 3.1 Terms

For the purposes of the present document, the terms given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

**Network Digital Twin (NDT):** virtual replica of mobile network or part of one, that captures its attributes, behaviour and interactions

NOTE 1: Mobile network includes both RAN and Core Network.

NOTE 2: NDTs can interact with other NDTs during simulation or emulation activities, and dynamically adapt their internal behavior based on such interactions.

\* \* \* Next Change \* \* \* \*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 28.552: "Management and orchestration; 5G performance measurements".

[3] 3GPP TS 28.554: "Management and orchestration; 5G end to end Key Performance Indicators (KPI)".

[4] 3GPP TS 32.422: "Telecommunication management; Subscriber and equipment trace; Trace control and configuration management".

[5] 3GPP TS 28.111: "Management and orchestration; Fault Management (FM)".

[6] 3GPP TS 28.541: "Management and orchestration; 5G Network Resource Model (NRM); Stage 2 and stage 3".

[7] 3GPP TS 28.622: "Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".

[8] 3GPP TS 28.532: "Management and orchestration; Generic management services".

[x] 3GPP TS 28.104: "Management and orchestration; Management Data Analytics (MDA)".

\* \* \* Next Change \* \* \* \*

## 3.2 Symbols

For the purposes of the present document, the following symbols apply:<symbol> <Explanation>

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

AMF Access and Mobility Management Function

CSPs Communication Service Providers

DT Digital Twin

ES Energy Saving

MDA Management Data Analytics

MDAF Management Data Analytics Function

MDT Minimization of Drive Tests

ML Machine Learning

MOI Managed Object Instance

NDT MnS Network Digital Twin Management service

SMF Session Management FunctionS-NSSAI Single Network Slice Selection Assistance Information

SON Self-Organizing Networks

UDM Unified Data Management

UL/DL Uplink / Downlink

\* \* \* Next Change \* \* \* \*

#### 5.4.2.2 Using NDT to generate ML training data

ML training usually requires large amounts of data to guarantee good performance of the ML models. In general, the ML training data for network related use cases is obtained through historical network management data. For instance, assuming that there is a ML model supporting MDA SLS analysis described in TS 28.104 clause 7.2.2, the raw feature of training data could be the enabling data, such as UL/DL throughput, uplink/downlink delay, etc., as specified in clause 8.4.2 of TS 28.104 [x].

However, obtaining data from the network has the following limitations:

- The quantity of issues happened in actual mobile network is limited.

- The variety of issues happened in actual mobile network is limited. There could be corner network issues that hardly happen in live network.

Sufficient ML training data plays a key role to a useful ML model. The more training data provided, the better the performance of ML model. To overcome these challenges, the MnS consumer can request the NDT to generate data with an indication of data requirements, e.g. data type, required data period, data sampling periods, etc. When the request is sent by the MnS consumer, the NDT can execute the simulation and generate data corresponding to the request. The NDT sends a report with the generated data to the MnS consumer, which can be used to enhance model accuracy by providing a wide range of training examples that reflect potential real network conditions.

\* \* \* End of Changes \* \* \* \*